DRAFT
LAB ROUND TABLE FOCUS GROUP RECOMMENDATION
QUALITY CONTROL FOR TABLE 1 ANALYTES
(FIELD PRECISION)
RECOMMENDATION #2.2

15 May 2006

OBJECTIVE FOR ***FIELD DUPLICATE AS ONE QUALITY CONTROL MEASURE*:** Field duplicates are an important indicator of good quality field sampling protocol. The field duplicates are an indicator of consistency in sample collection procedures that will ensure accurate and reproducible results.

PROBLEM STATEMENT:

The Field Quality Control section of the draft Coalition Group MRP, Attachment B, Quality Assurance Project Plan (Section 5.4. Pages 7-8) requires that laboratories have to reanalyze the field sample and its duplicate if the RPD is greater than 25%. Specifically, the draft MRP states, "If the RPD of field duplicate results is greater than 25% and the absolute difference is greater than the RL, both samples should be reanalyzed." The necessity for this recommendation is to allow for flexibility in the relative percent difference of 25% (RPD) for constituents that tend to have a greater variability due to the nature of the analytical method.

The purpose for collecting and analyzing field duplicates and/or field splits is to obtain an estimate of the variability in analytical results for a specific parameter, sample location, and time. There are three main sources of variation in the analysis of environmental samples; variation of the natural environment itself, variation in the sample collection and sub-sampling technique, and laboratory-based variation. The natural environment is highly variable and often is the largest source of variation even when samples are collected simultaneously. Field sampling and sub-sampling variation can be minimized by the use of good sampling techniques but they have no control over the natural variation. Laboratory variation increases as the analytical result approaches the method detection limit and varies by analytical method with some methods being less variable than others. Moreover, data obtained from multiple laboratories will also have increased variation due to differences in methods used and/or variation caused by sub-sampling techniques. Laboratories do minimize variation using good laboratory practices but the laboratory has no control over field sampling variation or natural variation.

QAPP requirements often include acceptance criteria placed on the laboratory based on field duplicate samples. These criteria are difficult for laboratories to achieve because of their lack of control over sampling and natural variation. Field duplicates are often replaced or enhanced by laboratory-based duplicates (i.e. sub-samples taken from the same sample bottle), but sub-sampling for laboratory duplicates is still dependant on the homogeneity of the sample. Therefore, laboratories will also analyze duplicate matrix

spikes, blank spikes, laboratory control materials, or certified reference materials in order to provide an estimate of the laboratory-based variation independent of the environmental samples.

Additional problems related to requiring laboratories to achieve acceptance criteria for field duplicates are short sample holding times that do allow enough time for the laboratory to do the re-analysis, e.g. microbiology samples, and results that at or near the MDL or PQL.

RECOMMENDATION:
It is recommended that the definition of a field duplicate and field split be inserted into the draft MRP Section 5.4.

Field Duplicates/Field Splits *– A field duplicate is a separate sample collected in the same manner and as close in time as possible to the original sample. A field split is a larger volume sample that is collected, homogenized, and split into duplicate samples in the field. A field duplicate or field split sample will be collected at the rate of 5% for each analysis (or one set per sampling event whichever is more frequent). This effort is to attempt to examine field homogeneity as well as sample handling, within the limits and constraints of the situation. Results from field duplicate analyses are for informational purposes to indicate natural variation or problems related to field sampling techniques. All results with an RPD that is greater than 25% should be qualified and communicated to the project manager. If the RPD for the duplicate field samples or splits is greater than 25% for results that are greater than 10 times the MDL, and the laboratory-based precision is also greater than 25%, then both samples should be reanalyzed.*

It is also recommended that QAPP acceptance criteria for laboratory precision be based on laboratory-based duplicate samples only such as duplicate matrix spikes, blank spikes, laboratory control materials, or certified reference materials.-When the analysis of bacteria (E. coli or fecal coliform) is required, the laboratory must ensure that they have validated laboratory precision, and continue to meet quality control requirements as specified in Standard Methods 9020B, 19th Edition. Possession of valid CA ELAP or NELAP certification for microbiology of wastewater will satisfy requirements for analyses of bacteria (E. coli or fecal coliform).